

Curriculum Vitae

Lee Makowski

Current Address:

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Education:

1976	Ph.D.	Electrical Engineering Massachusetts Institute of Technology
1973	M.S.	Electrical Engineering Massachusetts Institute of Technology
1971	B.S.	Physics Brown University

Research and/or Professional Experience:

2000-	Director, Biosciences Division, Argonne National Laboratory
2001-	Senior Fellow, Computation Institute, University of Chicago
1999-2000	Program Director, Materials Research Science and Engineering Centers Division of Materials Research, N.S.F.
1997-1999	Program Director, Instrumentation and Instrumentation Development Division of Biological Infrastructure, N.S.F.
1993-1999	Professor, Department of Biological Sciences, and Department of Chemistry, Florida State University
1993-1997	Director, Institute of Molecular Biophysics and Program in Structural Biology, Florida State University
1991-1993	Professor, Dept. of Physics, Boston University
1987-1991	Associate Professor, Dept. of Physics, Boston University
1982-1992	Guest Assistant Scientist, Brookhaven National Laboratories
1980-1987	Assistant Professor, Department of Biochemistry and Molecular Biophysics, College of Physicians and Surgeons of Columbia University
1978-1980	Senior Research Associate, Structural Biology Laboratory, Brandeis University
1976-1978	N.I.H. Postdoctoral Fellow, Structural Biology Laboratory Brandeis University, Waltham, Massachusetts

Professional Activities

2000-	Senior Advisor, Nanoframes LLC
2001-	Member, Executive Board; Computation Institute, University of Chicago
2000	Organizing Committee, 'Phage Display, Structure and Assembly'; Vancouver, 9/2000.
1999-2000	Consultant, EntreMed Inc., Rockville, Md.
1999-	Member, BioCAT Advisory Committee, Advanced Light Source, Argonne Natl. Lab.
1998	Member, SMIG Working Group on Cost Sharing, NSF
1997-1999	Member, American Physical Society Biological Physics Prize Committee
1997	Organizer; Conference on 'Quasi-equivalence: Motion and Adaptability in Living Molecules' January, Tallahassee, Fl.
1996-1997	Program Director; NSF Research Training Group in 'Structural Biology of

	Macromolecular Assemblies' (Florida State University)
1992	Program Chair, Biophysical Society Meeting, Houston.
1990-1993	Executive Council, Biophysical Society
1990-1993	Program Director; NIH Training Grant; Structural Biology (Boston University)
1989	Organizing Committee, Workshop in 'Fiber Diffraction from Biological Macromolecules, May, Fall Creek Falls
1988-1994	Member, Biophysics Program Advisory Panel, NSF
1988-1993	Council Member, Biophysical Society
1987-1993	Associate Editor, Biophysical Journal
1985	Organizing Committee, 4th Biophysical Discussion, Macromolecular Assemblies Analyzed by Converging Structural Techniques, November, Airlie Va.
1981-1986	Irma T. Hirsch Career Scientist Award
1978-1982	Alfred P. Sloan Research Fellow

Selected Publications:

- Makowski, L. and M. Glicksman (1973) Disorder scattering in solid solutions of III-V semiconducting compounds. *J. Phys. Chem. Solids* **34**, 487-492.
- Makowski, L. (1976) An x-ray diffraction study of membrane gap junctions. Ph.D. Thesis, Massachusetts Institute of Technology.
- Caspar, D.L.D., D.A. Goodenough, L. Makowski, and W.C. Phillips (1977) Gap junction structures. I. Coordinated electron microscopy and x-ray diffraction. *J. Cell Biol.* **74**, 605-628.
- Makowski, L., D.L.D. Caspar, W.C. Phillips and D.A. Goodenough (1977) Gap junction structures II. Analysis of the x-ray diffraction data. *J. Cell Biol.* **74**, 629-645.
- Makowski, L. (1978) Analysis of x-ray diffraction data from partially oriented specimens. *J. Appl. Cryst.* **11**, 273-283.
- Makowski, L., D.L.D. Caspar and D.A. Marvin (1980) Filamentous bacteriophage Pf1 structure determined at 7 Å resolution by refinement of models for the α -helical subunit. *J. Mol. Biol.* **140**, 149-181.
- Makowski, L. (1980) Structural studies of the assembly of simple viruses, in *Biological Recognition and Assembly*; (D.S. Eisenberg, J.A. Lake and C.F. Fox, eds.) Alan R. Liss, Inc., New York, 233-258.
- Makowski, L. (1980) Resolution of x-ray intensities by angular deconvolution, in *Diffraction Methods for Structural Determination of Fibrous Polymers*; (A.D. French and K.H. Gardner, eds.) American Chemical Society Symposium Series, **141**, 139-148.
- Makowski, L. (1981) The use of continuous diffraction data as a phase constraint I. One-dimensional theory. *J. Appl. Cryst.* **14**, 160-168.
- Moody, M. and L. Makowski (1981) The structure of the tail core of bacteriophage T2. *J. Mol. Biol.* **150**, 217-245.
- Makowski, L. and D.L.D. Caspar (1981) The symmetries of filamentous phage particles. *J. Mol. Biol.* **145**, 611-617.
- Makowski, L. (1982) The use of continuous diffraction data as a phase constraint II. Application to fiber diffraction data. *J. Appl. Cryst.* **15**, 546-557.
- Makowski, L., D.L.D. Caspar, D.A. Goodenough and W.C. Phillips (1982) Gap junction structures III. The effect of variations in the isolation procedure. *Biop. J.* **37**, 189-191.
- Stubbs, G. and L. Makowski (1982) Coordinated use of isomorphous replacement and layer-line splitting in the phasing of fiber diffraction data. *Acta Crystallographica* **A38**, 417-425.

- Makowski, L. and J. Li (1983) X-ray diffraction and electron microscope studies of the molecular structure of biological membranes. In: *Biomembrane Structure and Function* (D. Chapman, ed.), Macmillan, London, 43-166.
- Makowski, L., D.L.D. Caspar, W.C. Phillips and D.A. Goodenough (1984) Gap junction structures V. Structural chemistry inferred from x-ray diffraction measurements on sucrose accessibility and trypsin susceptibility. *J. Mol. Biol.* **174**, 449-481.
- Makowski, L., D.L.D. Caspar, W.C. Phillips, T.S. Baker and D.A. Goodenough (1984) Gap junction structures VI. Variation and conservation in connexon conformation and packing. *Biop. J.* **45**, 208-218.
- Makowski, L. (1984) Structural diversity in filamentous bacteriophages. In: *Biological Macromolecules and Assemblies*, **1**, *The Viruses*. (A. McPherson, ed.) John Wiley and Sons, N.Y. 203-253.
- Makowski, L. (1985) Structural domains in gap junctions: Implications for the control of intercellular communication. In: *Gap Junctions*. (M.V.L. Bennett & D. Spray, eds.) Cold Spring Harbor Laboratories. 5-12.
- Stubbs, G., K. Namba and L. Makowski (1986) Application of restrained least-squares refinement to fiber diffraction from macromolecular assemblies. *Biop. J.* **49**, 58-60.
- Glucksman, M.J., R.D. Hay and L. Makowski (1986) X-ray diffraction from magnetically oriented solutions of macromolecular assemblies. *Science*. **231**, 1273-1276.
- Makowski, L. and B. Magdoff-Fairchild (1986) Polymorphism of sickle cell hemoglobin aggregates: Structural basis for limited radial growth. *Science*. **234**, 1228-1231.
- Makowski, L. (1986) Propagation of phase errors during phase refinement and extension. *Acta Crys.* **A42**, 253-256.
- Makowski, L. (1986) Gap junction structures: Comparison of x-ray diffraction data with data from electron microscopy of frozen hydrated specimens. *Proc. XIth Int. Cong. Elect. Microscopy*, Kyoto, Japan, 1873-1876.
- Specthrie, L., J. Greenberg, M.J. Glucksman, J. Diaz and L. Makowski (1987) Structural responsiveness of filamentous bacteriophage Pf1: Comparison of virion structure in fibers and solution: The effect of temperature and ionic strength. *Biop. J.* **52**, 199-214.
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- Nambudripad, R., W. Stark and L. Makowski. (1991) Neutron diffraction studies of the structure of filamentous bacteriophage Pf1: Demonstration that the coat protein consists of a pair of alpha helices with an intervening, non-helical surface loop. *J. Mol. Biol.* **220**: 359-379..
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- Makowski, L. (1991) An estimate of the total number of independent structural parameters measurable in a fiber diffraction pattern. *Acta Crystallographica A47*, 562-567.

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- Bhattacharjee, S., M. Glucksman and L. Makowski (1992) Structural polymorphism correlated to surface charge in filamentous bacteriophages. *Biop. J.* **61**; 7625-735..
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- Makowski, L. (1992) Terminating a macromolecular helix: Structural model for the minor proteins of bacteriophage M13. *J. Mol. Biol.* **228**; 885-892.
- Gong, M.F. and L. Makowski (1992) Helical structure of P-Pili from *Escherichia Coli*: Evidence from x-ray fiber diffraction and scanning transmission electron microscopy. *J. Mol. Biol.* **228**; 735-742.
- Makowski, L. (1993) Structural constraints on the display of foreign peptides on filamentous bacteriophages. *Gene* **128**; 5-11.
- Makowski, L., H.F. Batliwala, T. Somasundaram and E.E. Uzgiris (1994) Method and system for allowing increased migration across a lipid bilayer. *U.S. Patent #5,284,588*, Feb. 8, 1994.
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- Makowski, L. (1994) Phage display: Structure, assembly and engineering of filamentous bacteriophage M13. *Current Opinion in Structural Biology* **4**, 225-230.
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- Makowski, L. and M. Williams (2003) Staged Assembly of Antibodies and Antibody Domains. Patent Application.
- Makowski, L. and A. Soares (2003) Estimating the Diversity of Peptides Populations from Limited Sequence Data. *Bioinformatics*, **19**:483-489.

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- Rodi, D.J., S. Mandava, and L. Makowski (2004) DIVAA: analysis of amino acid diversity in multiple aligned protein sequences. *Bioinformatics* **20**:1-9.
- Fischetti, R. F. , D. J. Rodi, D.B. Gore and L. Makowski (2004) Wide angle x-ray solution scattering as a probe of ligand-induced conformational changes in proteins. *Chemistry and Biology* **11**, 1431-1443.
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- Hoffmann, A., A.-H. Chung, S.D. Bader, L. Makowski and L. Chen (2005) Brownian motion in biological sensing. in *Biomedical Applications of Nanotechnology* (ed. V. Labhsetwar and D.L. Leslie-Pelecky) J. Wiley and Sons, Inc., N.Y..
- Carter, D.M., J.-N. Gagnon, M. Damlaj, S. Mandava, L. Makowski, D. J. Rodi, P.D. Pawelek, and J. W. Coulton (2006) Phage Display Reveals Multiple Contact Sites between FhuA, an Outer Membrane Receptor of Escherichia coli, and TonB *J. Mol. Biol.* **357**, 236–251
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